

PORTLAND FIRE WEATHER - 2003 ANNUAL REPORT

2002-2003 SNOWPACK DATA (FOR GOVERNMENT CAMP)

The Government Camp snowpack data (see chart on page 9) shows the 2002-2003 snow depth and average for Government Camp. The 2002-2003 season was rather unusual. November was abnormally dry, only 41% of normal precipitation. There was no snowpack through November and into early December. Normally, the snow depth is around 20 inches by mid-December. A series of storms in mid to late December brought the snow depth up to around 45 inches by the first of January, which was above normal. However, a change to wet and mild conditions in January eliminated the snowpack. Conditions did not improve in February, due to below-normal precipitation. A parade of cold and wet storms in early March dumped record-breaking snowfall to the Cascades. The snow depth reached a peak of 77 inches on March 10. The snow pack quickly diminished, falling below normal by the 15th. There was another period of cool and wet weather in early April that brought the snow depth to about 50 inches. The snow was gone by the end of April, which was much sooner than normal (end of May).

2003 FIRE SEASON LIGHTNING DATA

Table two shows the areal frequency of lightning for the 2003 season.

TABLE TWO: 2003 LIGHTNING DATA

AREA	# LIGHTNING DAYS 2003	AVE. # DAYS (LAST 10 YEARS)	PERCENT AVE.
ZONES 601/612	14	5.7	245.6%
ZONES 602/603	14	4.7	297.9%
ZONE 604	19	6*	316.7%
ZONES 605/607/660	15	10.4	144.2%
ZONES 606/608	17	11.9	142.9%
ZONE 609	7	10.1	69.3%
ZONES 610/611	21	18.0	116.7%

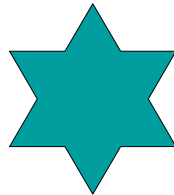
TABLE TWO: 2003 LIGHTNING FREQUENCY. ALL LIGHTNING DATA OBTAINED FROM BLM DATA.

* The average number of “thunderstorm days” during the fire season (typically May through October). The annual average is slightly higher.

There are some interesting conclusions in the 2003 lightning data. The most obvious fact is the high frequency of lightning. Nearly all areas experienced well-above normal lightning activity. The west

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side observed several days of lightning in May. The Willamette Valley had seven days of lightning. August was another notable month. A good outbreak occurred during the first week. Many areas had lightning three or four days in a row. One of the more interesting facts was the 14 days of lightning for the coastal zones. The 14 days was, by far, the most in the past 10 years. In fact, the previous high for zones 602 and 603 was six days in 1997. The Deschutes N.F. and the Warm Springs Reservation received above-normal lightning. The 21 days was the most since 1998 (25 days). Most of the lightning events were confined to the Deschutes N.F. It seemed the moist south flow would make it into the Deschutes, but then southwest to west flow in the Warm Springs area would prevent the lightning activity from making any further northward progress. This can be seen in the lightning frequency for zone 609. There were just seven days of lightning in 2003. Lightning activity in zone 609 has been well-below normal three out of the last four years.



FAST FACTS: Zone 604 (Willamette Valley) had 19 days of lightning (at least one strike in the zone) during the 2003 fire season. There were 8 lightning days in August, and five days in a row (August 4-8). No other area had such a streak. The Central Cascades and foothills (zones 606 and 608) had a string of four lightning days in a row (August 3-6). Zone 609 had just seven lightning days in 2003, but three occurred from August 4-6.

The late-July hot spell brought triple-digit temperatures to many areas, even the Coast Range zones (602 and 603). Clay Creek RAWS had a high of 104 on July 29, and 102 on the 30th. Many other locations were in the mid to upper 90s. Highs in the middle to upper 90s also occurred during a record hot spell in early September. Clay Creek recorded 99 degrees September 2. Rye Mountain had a high of 96. Village Creek reached 98 on the 3rd.

Zones 610 and 611 went the entire season without recording at least one day when median precipitation was 0.25 inches or more. This also happened in 2002 and in 2000 (extreme fire years). Zone 609 showed a similar trend. There were just two days when the average precipitation was 0.25 inches or more. There were no such days in 2000, and just one in 1998.

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RED FLAG WARNING STATISTICS FOR 2003

Table three shows the Red Flag verification statistics for the 2003 fire season.

TABLE THREE (ALL WARNINGS)

ZONE	#RFW	CORRECT RFW (A)	INCORRECT RFW (B)	MISSED EVENTS (C)	POD A/(A+C)	CSI A/(A+B+C)	FAR (1-[A/(A+B)])
601	1	0	1	0	0	0	1.00
612	1	0	1	0	0	0	1.00
602	1	0	1	0	0	0	1.00
603	2	0	2	1	0	0	1.00
604	2	1	1	0	1.00	0.50	0.50
605	2	0	2	0	0	0	1.00
606	2	0	2	0	0	0	1.00
607	4	1	3	0	1.00	0.25	0.75
608	4	1	3	3	0.25	0.14	0.75
660	2	1	0	1	0.50	0.50	0
609	3	1	2	0	1.00	0.33	0.67
610	3	1	2	3	0.25	0.17	0.67
611	3	2	1	2	0.50	0.40	0.33
TOTALS(ALL)	30	8	21	10	.444	.205	.724
DRY LTG**	20	1	13	0	1.00	.070	.929
WIND/RH	10	7	8	10	.412	.280	.533

NUMBER OF WARNED EVENTS: 4
EVENTS PRECEDED BY A WATCH: 3 or 75%
MISSED EVENTS: 6

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NOTE: There were three warning events that included dry lightning. However, the three warnings were also in conjunction with high Haines indices and/or low humidity. The dry lightning criteria took precedent in the verification scheme. One dry lightning event (lightning after a prolonged dry spell) did not verify (even though lightning occurred) because no such criteria was listed in the annual operating plan. This WILL be added to the 2004 operating plan.

EVENT LEAD TIMES

WARNING LEAD TIMES

EVENT	RANGE OF LEAD TIMES	AVE. ZONE LEAD TIME
July 20-21 (Dry Lightning/High Haines)	7 hrs 9 mins ZONE 611	7 HOURS 9 MINS
July 22 (Dry Lightning)	8 hrs 16 mins	8 HRS 16 MINS
September 2-4 (Dry Lightning/High Haines/Low RH)	DID NOT VERIFY	DID NOT VERIFY
September 25-27 (Wind/RH)	16 hrs 30 mins ZONE 660 27 hrs 30 mins ZONE 604	22 HOURS

WATCH LEAD TIMES

EVENT	RANGE OF LEAD TIMES	AVE. ZONE LEAD TIME
July 20-21 (Dry Lightning/High Haines)	28 hrs 54 mins ZONE 611	28 HOURS 54 MINS
July 22 (Dry Lightning)	8 hrs 16 mins	8 HRS 16 MINS
September 2-4 (Dry Lightning/High Haines/Low RH)	DID NOT VERIFY	DID NOT VERIFY
September 25-27 (Wind/RH)	37 hrs 05 mins ZONE 660 NO WATCH ZONE 604	37 HOURS 05 MINS

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A few notes on verification and the 2003 events: The overall severity of any fire season is highly correlated with the extent and frequency of critical fire weather patterns during the season. It is not unusual to have an extended “dry period” during any given fire season. This in itself could result in an elevated degree of fire activity, provided the fuel conditions are right. However, to elevate a high fire danger situation to a critical level normally requires an additional weather element to be superimposed on the dryness factor. This additional element could be “dry” lightning, an extremely unstable air mass, or a combination of strong wind and low humidity. Red Flag warnings are issued when a combination of critical weather elements exists **WITH** sufficiently dry fuels and severe burning conditions.

Determining lead time for dry lightning is highly subjective. In fact, the current criteria for “dry lightning” is rudimentary and subject to debate. It is a given that fires **WILL** occur during or after a lightning episode following an extended dry spell. However, does that fact alone warrant a Red Flag Warning? If all the fires remain “small” and/or initial attack can handle them, was the event “critical”? Should one or more fires get “big”, then it is reasonable to assume the event was critical and a warning was justified.

There was a warning event based on “lightning after a prolonged dry spell”. Although this is a legitimate criteria, it was not listed in the Annual Operating Plan. Therefore, despite the fact lightning did occur, it did not meet verification criteria and was considered a “miss”. This criteria **WILL** be added to the 2004 Operating Plan. However, some objective parameters need to be established for this criteria.

New Red Flag Criteria were used in 2003. These criteria were developed based on several years of RAWS data. The premise was to come up with criteria that **COULD** be met, but not too often. We tried to find criteria that would occur an average of 2-4 times a season. Anything more than that would probably be considered “not significant”. Based on the 2003 results, the wind/RH criteria were inadequate. A prime example of this was the September 25-27 east wind case. Despite the fact east or offshore flow occurred in many areas, only two zones met their criteria. Zone 660 met criteria, yet adjacent zones 605 and 607 did not. It is hard to imagine east wind in the Gifford Pinchot, but not in the Mt. Hood. This was a major flaw in the criteria. Also, the RAWS data had a lot to do with the lack of verification. RAWS stations undergo many environmental changes over time. They can get inundated with brush, trees, etc. A good wind site in the past may become a poor wind site over time due to the growth of brush or trees.

The 2003 criteria were too complicated. Each zone had its own criteria, which can be confusing to the users. New criteria were developed shortly after the end of the season. The forecast area was divided into five distinct areas: 1) Zones 601 and 602, 2) Zones 603 and 612, 3) Zone 604, 4) Zones 605, 607 and 660, and 5) Zones 606 and 608. In addition, another stipulation was added: If criteria was met in one zone (in an area) then **ALL** zones in that area were considered to meet criteria.

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Another problem arises when verifying warnings by zone. Multiple zones may be included in a warning, but some areas may not have “good” verifying observing stations. Some zones may end up not meeting warning criteria simply because there are no “good” verification stations. This, in turn, will result in lower Probability of Detection (POD) scores, and higher False Alarm Rates (FAR). Moving RAWs may actually hinder verification as well. For instance, HeHe Butte (zone 610) was moved in 2001. This RAWs was in a protected area and was not wind-sensitive. However, once the RAWs was moved, it became a very wind-sensitive station. This station reached Red Flag criteria much more often in 2002 and resulted in some “missed” events.

NEW FOR 2004

There will be some significant changes to the fire weather program in 2004. The biggest change will be the change of forecast responsibility regarding the east side zones. The Pendleton forecast office will assume the forecast for zones 610, and 611. Zone 609 remains uncommitted as of early January. It is possible the Portland forecast office will be responsible for the western districts, and Pendleton will handle the Barlow district.

The second major change concerns the wind/RH Red Flag criteria. New criteria were developed to provide a more representative baseline. The previous criteria were complicated and, according to RAWs data, too stringent in some zones and not stringent enough in other zones. It was decided to separate the district into five distinct areas: 1) North Coast and Coast Range, 2) Central Coast and Coast Range, 3) Willamette Valley, 4) South Washington and North Oregon Cascades and foothills, and 5) Central Oregon Cascades and foothills. Furthermore, if Red Flag criteria occurred in **ONE** zone of any group, then, for verification purposes, Red Flag criteria occurred in **ALL** zones of the respective group. In other words, if Red Flag criteria was met in Zone 605, then, by default, it also occurred in zones 607 and 660, even if the RAWs in those zones did not show it. It is hard to imagine an east wind event in zone 605, but not 607 and/or 660. The groups and criteria are shown below:

A. NORTH COAST AND COAST RANGE (ZONES 601 AND 602)

Two stations for three (3) hours: 35% RH or less and 10 mph or more.

B. CENTRAL COAST AND COAST RANGE (ZONES 603 AND 612)

Two stations for three (3) hours: 35% RH or less and 10 mph or more.

C. WILLAMETTE VALLEY (ZONE 604)

Two stations for four (4) hours: 25% RH or less and 15 mph or more.

D. SOUTH WASHINGTON AND NORTH OREGON CASCADES AND FOOTHILLS (ZONES 605, 607, AND 660)

Two stations for three (3) hours: 35% RH or less and 10 mph or more.

E. CENTRAL OREGON CASCADES AND FOOTHILLS (ZONES 606 AND 608)

Two stations for three (3) hours: 30% RH or less and 10 mph or more.